Improving the Use of Variable Rate Intravenous Insulin Infusions (VRIIIIs) on the Surgical Emergency Unit

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**Background**
Insulin is a high priority medicine that is prone to prescription, administration and monitoring errors. At OUH, there is a Medicines Information Leaflet for its use.

**Aim**
Reduce the prescribing and monitoring errors of VRIIIIs on the Surgical Emergency Unit.

**Methods**
Data were collected retrospectively in March & April 2018:
- Patient MRN
- VRIII indication
- Insulin dose, VRIII regime and fluids prescribed
- Monitoring of capillary blood glucose (CBG) hourly

**Staff questionnaires:**
- Awareness, location and implication of guideline
- Familiarity, use and suggested improvements to guideline (free text)
- Knowledge of long-acting insulin use
- Practical limitations to monitoring CBG hourly

**Results**
Retrospective data:

<table>
<thead>
<tr>
<th>Objective</th>
<th>% patients in whom achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate insulin regime prescribed</td>
<td>70 (n=7)</td>
</tr>
<tr>
<td>Insulin rate correct for given CBG</td>
<td>50 (n=5)</td>
</tr>
<tr>
<td>CBG measured hourly</td>
<td>30 (n=3)</td>
</tr>
<tr>
<td>Regime altered if CBG more than 12 for 3 consecutive readings</td>
<td>0</td>
</tr>
<tr>
<td>Baseline U&amp;Es obtained</td>
<td>80 (n=8)</td>
</tr>
<tr>
<td>U&amp;Es measured at least daily</td>
<td>0</td>
</tr>
<tr>
<td>Usual long-acting insulin prescribed if applicable</td>
<td>75 (n=3)</td>
</tr>
</tbody>
</table>

**Staff Questionnaires:**

Are you aware that there is a Medicines Information Leaflet (MIL)?
- Prescribers: Yes 100% (n=11), No 0% (n=0)
- Nurses: Yes 90% (n=9), No 10% (n=1)

Do you think the MIL is easy to interpret?
- Very easy
- Somewhat easy
- Neither easy or difficult
- Somewhat difficult
- Very difficult

**Suggested Improvements to MIL**
- Simplify/improved clarity: 9
- Increase publicity: 2

**Implementations**

Variable Rate Intravenous Insulin Infusions (VRIII) in Adults - Prescribing on SEU

1. Creation of simplified posters to place on the ward
2. Provision of short educational sessions
3. Run PDSA cycle again
4. Further: alter guidelines/MIL

1. VRG is indicated for patients:
   1. With acute severe hyperglycaemia or capillary blood glucose (CBG) is over 12 mmol/L.
   2. Who are going to miss two or more meals and are either:
      - Taking insulin for diabetes or
      - Have T2DM and CBGs have been over 12 mmol/L for more than 2 hours
   3. Have an initial of over 60 mmol/L (8.5%) and surgery cannot be delayed.

**Prescribe on EMIS**
Use the "Insulin - Adult Variable Rate Insulin Infusion Powerwall" as ePhmA to guide prescribing the following aspects of the prescription:
- Choose regime based on patient’s usual 24 hourly insulin requirements
- Prescribe glucose 20%, 25 mL intravenous PRN
- Prescribe supportive glucose containing intravenous infusions depending on electrolyte levels and fluid status

**Monitor:**
- Review U&Es daily and adjust IV fluids accordingly
- Ensure patient always has a prescription for a source of glucose
- Decrease the prescription
  - (if CBG over 12 mmol/L, for three or more readings and the CBG are not falling by at least 3 mmol/L per hour (ask Inpatient Diabetes Team for advice if already on increased regimen)
- Reduce the prescription
  - If treatment for hypoglycaemia is given and CBGs remain below 4 mmol/L after 15 minutes, change to lower regimen
  - If CBG between 4-6 mmol/L on two or more consecutive hourly readings, consider reducing to a lower regimen
- Review need for VRG daily
- If VRG needed for more than 48 hours, refer to the Inpatient Diabetes Team.